

FRANCE – GERS

Agro-forestry

The case study described here can be characterised as a typical example of an activity which can potentially affect in a positive way the existence of higher linkages between primary agricultural production, environmental protection, and the wider rural economy in the study area of the Gers (France). More specifically, the utilisation of this particular agricultural project can potentially result in a more sustainable use of agricultural resources, the protection of the environment, and the diversification of the local economic base.

1. Project details:

Nature of the project

Purpose: This main goal is to reintroduce tree and hedge rows in the middle of the agricultural fields. By optimising the benefits from the biological interactions created when trees and/or shrubs are deliberately combined with crops and/or livestock, the NGO "Arbre & Paysage 32" assists farmers to develop agro-forestry in the Gers agricultural production model. In fact, an agro-forestry plot allows a real financial gain per hectare that in turn affects grain yields and livestock. Trees and hedges are no longer seen as merely part of the landscape but as a local resource; they protect the soil and they provide farmers with a new market opportunity they can harvest and sell the wood.

Content: the Regional Council and the General Council have supported the establishment of an experimental programme of agro-forestry in Gers since late 2006. The cultivation technique is to plant rows of trees (hardwoods, usually noble species) in the agricultural plots. Convinced of the relevance of the agro-forestry model, the NGO "Arbre & Paysage 32" initiated and promoted this agro-forestry experiment involving 20 farmers. In total, more than 100 hectares have been planted throughout the department, mainly with crop systems, but also with pig and poultry farms, and viticulture. The tree component of agro-forestry systems can be isolated trees, tree-hedges, and low-density tree stands. An agro-forestry plot is defined by two characteristics:

- at least 50% of the area of the plot is in crop or pasture production,
- tree density is less than 200/hectare (of stems greater than 15 cm in diameter at 1,3 meter height), including boundary trees.

Inspiration: The inspiration came from the "Silvo-arable Agro-forestry for Europe" (SAFE) research project, sponsored by the European Union, which was coordinated by the French National Institute for Agricultural Research of Montpellier in France (INRA). More than 70 scientists from eight European countries participated in the project between 2001 and 2005. This European Research contract produced a final report with clear recommendations for the 2007-2013 European regulation about agro-forestry.

Policy coherence: The project is coherent with the strategic aims of regional (Midi-Pyrénées Region) and local (Gers General Council) rural development policy, especially regarding the goals of preserving the landscape, developing biodiversity, encouraging sustainable agriculture, and creating more income possibilities for farmers. Within its Agenda 21 goals, the General Council of Gers outlines a plan to develop energy recovery from biomass (excluding fuel), and for this reason has been involved in this project.

This agro-forestry project is coherent with the French strategy on biodiversity, established in 2004, which aims to prevent the loss of biodiversity by creating a green belt network (green corridors) and a blue belt network (waterways and bodies of water, together with surrounding areas of vegetation).

Links between agriculture and the rest of the economy

Main agricultural sub-sectors involved: As a production system, agro-forestry generates income from:

- marketable products (crops/livestock): crops and animal production are the main agricultural sub-sectors involved. The first results show that the agro-forestry model increases productivity by 30%.
- the sale of harvested wood: energy (biomass production) other local sectors involved mainly include energy, as farmers are encouraged to provide local wood for the "Bois-énergie" economic sector. New market opportunities have created new links between farmers and wood suppliers and local governments (filière bois-énergie). Local communities (e.g. Communauté de Communes Bastides et Vallons) are studying the possibility of heating their buildings (schools, retirement communities, hospitals) with local wood harvested from forests and hedges. Wood is also supplied for building houses, furniture, and woodcrafts.

Description of these links: The main goal of agro-forestry is to enhance the production of crops and livestock by preserving the environment. In fact, the introduction of low-density trees has a beneficial effect on the plot; a tree acts as a regulator and water purifier, conservative and soil improver, protector of crops and livestock, and biomass producer. The impact is significant on both the biodiversity and the quality of the soil and water. This approach may also foster the development of organic farming.

From the environmental perspective, the tree stores carbon, provides protection to crops, and attracts useful insects.

As economic agents who participate socially in the production, exchange, distribution, and consumption of goods and services in the local area, farmers are realizing that it is important to integrate sustainable development issues in their businesses. Wood is a product of the future because it is a renewable product. Moreover, the agro-forestry model includes species that are not produced by the forest such as ash, pear or walnut. This wood is used to build houses and furniture. Significantly, these woods act as substitutes for the tropical timber trade which is increasingly regulated and prohibited (as it is not environmentally sustainable).

The agro-forestry activity adds value by creating new income, while preserving biodiversity and soil. An entire new economic sector ("Bois-énergie" or "Wood-energy") is starting to be organised on the local level; this renewable energy is the local answer to sky-rocketing fuel prices. Agricultural cooperatives are involved in this new economic sector and have invested in machines to transform wood into insulating panels and chipped wood for boilers.

The trees (and harvested wood) create local value added and contribute to enhance the collaboration between farmers, cooperatives and entrepreneurs. Heating with wood is part of the trend "producing and consuming locally"; the use of an abundant, available resource (hedges or Riparian forest) develops economic activity in the revitalisation of the wood sector. The recent proliferation of wood-fueled boilers will begin structuring local supply, which does not require heavy investment but will exist only if opportunities are identified by the timber producers and farmers. In fact, wood pellet boilers are part of the long-term commitment of local communities and individual household to use carbon-neutral, cost-effective heating solutions across the Gers department.

Scale of the project

Size: Local level experimentation (100 hectares, 20 farmers assisted)

Time scale: 4 years

Coverage: Local with important repercussions nationally, as the results of this experiment, and the experience, will be recreated across the country in different regions.

Beneficiaries and supporters

Beneficiary: The main promoter is the NGO "Arbre & Paysage 32". Created in 1990 at the initiative of farmers, this NGO is dedicated to preserving the landscape by promoting and protecting trees and especially the hedge country. Bringing together 750 members (planters of trees and hedges in the countryside), this NGO has enabled the creation of nearly 800 km of hedgerows in the countryside of the Gers department. The NGO provides technical assistance for the final beneficiaries which are, of course, Gersois farmers. (The NGO is also working on a marketing initiative for agricultural products cultivated using the agro-forestry model; see "Wider Benefits" section).

Supporters: The main supporter involved is the French National Institute for Agricultural Research of Montpellier (INRA). The NGO has been able to establish new research and technical partnerships. The NGO « Association Française d'Agroforesterie" has also been a great support, promoting agro-forestry and opening the debate about it nationally. (See Institutional section)

Finance

Funding: This three-year experiment has cost 60,000 EUR. Each financial partner, the Region Midi-Pyrénées and the General Council of Gers, has provided 20,000 EUR for the project. The NGO has financed the other third of the project.

In 2007, the LAG Pays d'Armagnac funded a project of the NGO "Arbre & Paysage 32" (EU Funding: 20,000 EUR, 80% of the project) to organise a study-visit, print a booklet and promote the agro-forestry approach through debate and conferences. For the 2007-2013 period, this LAG may implement a cooperation project about agro-forestry along with the LAG PORTE de Gascogne (Gers) and the LAG Pays des Condruces (Belgium).

In 2009, the NGO also received a 10,000 EUR grant from the European Regional Development Fund (ERDF) (2007-2013) to organise training and raise awareness about the environment under the "Measure 5 - Information and education to the environment and sustainable development." The NGO has organised several training sessions about new agricultural techniques and economic opportunities, linked with Ramial Chipped Wood (RCW).

In 2010 the NGO will assist 11 farmers to plant 50 hectares of agro-forestry. This project will benefit from 10,000 EUR from EAFRD (measure 222) and 9,000 EUR from the Gers General Council.

Budget: As seen above, the NGO "Arbre & Paysage 32" has assisted 20 farmers with a 60 000 euros project. A tree costs around 15 euros. This price includes the preparation to plant the tree, the mulching, the consultation on tree care and maintenance for the three-year period, and protection against predators (like deer). The NGO has billed 10 euros / tree and the remaining cost has been financed by the farmer. In sum, the final cost for the farmer is about 150 euros per hectare.

Results

Direct results: The first evaluation of the project after three years is positive. The survival rate of planted trees is good and farmers have successfully integrated the trees into their farming practices.

Farmers have been accompanied technically by the NGO gradually learning to take care of the trees and drive the system to maximize synergies between trees and crops.

During three years, this experimental programme has allowed this NGO:

- to successfully test different types of biodegradable mulching and protection systems;
- to test the model adaptation to the diversity of agro-forestry production in Gers;
- to establish protocols for evaluation studies of biodiversity and biomass production.

The integration of trees into farming practices has positive effects on agriculture: yield is increased; soil fertility is enhanced; capillary permeability is increased; standing water is diminished; and soil aeration depth is improved due to the improved root development. Also, as a result, there is more habitat for auxiliary fauna (earthworms, ground beetles) which enhances biodiversity and improves the environmental conditions of the plots. This also reduces the use of herbicides and insecticides (except for slug killers).

Main target: The community at large (raising awareness of the environmental issues involved) and farmers (changing their behaviour by encouraging sustainable agricultural practices).

Wider benefits: Agro-forestry allows new forms of diversification of farm activities and makes better use of environmental resources. This type of mixed system, by the positive interactions of its components, may produce a higher biomass production of 10-60% compared with agricultural crops and forestry by itself. One new stream of income is Ramial Chipped Wood (RCW). This technique is increasingly applied to agriculture in the Gers department; local communities are following the lead of the town of Auch and the General Council of Gers in making use of their trees' wood to mulch their beds and shrubs.

Also, the NGO wants to use this environmental aspect to improve the marketing of agricultural products. They are currently working on the certification of products issued via the agro-forestry production model. This label will guarantee all the cross-compliance aspects, by including requirements regarding animal and plant health, animal welfare, and the maintenance of all agricultural land in good agricultural and environmental condition.

2. Relevance of case study experiences for others

Problems: While the interest for developing new agricultural practices based on agro-forestry was high, it was difficult for local farmers to completely change their agricultural production model. The NGO has been working hard to raise awareness about the benefits of this model.

Transferability and mainstreaming potential: This project can be replicated successfully elsewhere. Technical information must be developed locally or regionally for application within that region. Information which is too general or which is based on studies conducted in dissimilar regions or climate zones is not likely to convince landowners to adopt agro-forestry practices, or provide relevant skills and knowledge to ensure their success.

Innovation: Though the project is experimental, other models of agro-forestry already exist across Europe. The project has the potential to be transferred to other geographical areas.

Institutional aspects: In 2007, the French authorities decided not to activate the measure 222 within the French Rural development Plan (RDP). However, multiple requests from national and regional partners (including the Association française d'agro-foresterie and the Association française de l'arbre et de la haie) demonstrated a real interest for this agro-forestry measure.

In 2009, the Ministry of Food, Agriculture and Forestry defined a new strategy called "*OBJECTIVE LANDS 2020: Towards a new French model for agriculture*" to steward biodiversity and the landscape. The measure "15-Promotion of agro-forestry" aims to set up a special scheme to encourage the development of agro-forestry.

In consequence, the French authorities asked the EC in 2009 to include the measure 222 in its National Plan, and the modification has been accepted in May 2009 by the European Commission. The measure 222 "First establishment of agro-forestry systems on agricultural land" promotes the combination of extensive agriculture and forestry systems, aimed at the production of high quality wood and other forest products.

Finally, the launch of the measure provided in the RDP will make possible, where applicable, the encouragement of agro-forestry. In fact, several regions have recently "activated" this measure (or are in the process of activating it), in order to duplicate this experimentation and to allow farmers to launch agro-forestry projects (Picardie, Languedoc Roussillon; Midi Pyrénées; Poitou-Charentes, Bourgogne etc.) For the regions that wish to grant co-financing to European agro-forestry projects, this measure will enable 70% of the investment (study design, supply and planting)

Environmental aspects: Agro-forestry helps to conserve and protect natural resources by, for example, mitigating non-point source pollution, controlling soil erosion, and creating wildlife habitat. The benefits of agro-forestry add up to a substantial improvement of the economic and resource sustainability of agriculture. Agro-forestry practices are intensively managed to maintain their productive and protective functions, and often involve annual operations such as cultivation, fertilisation and irrigation. The protection of soil and water, in particular in sensitive areas, has been a key factor to limit erosion.

Sustainability: The main goal is not to convert the entire territory of Gers into the agro-forestry model but 10-20% of the Utilised Agricultural Area (UAA). Since trees occupy 10% of the floor area of an agro-forestry plot, converting 10% of the UAA, the operator loses at the outset that 1% of farm income. From the day when the operator begins to realise the income from the trees, INRA has calculated that it can up to double the farm income. Thus the system is financially sustainable in the long run.

Finally, it is important to continue to promote the importance of agro-forestry and explain the pros and cons of this new agricultural system to farmers.

Lessons to pass on: It is very important to get the support of a Research Institute to better understand the role of various environmental components (grass strips, hedges, and trees) and be able to make recommendations for improvements and management adapted to the new challenges that agriculture faces.